

What Is Claimed Is:

1. A photodetector using MOSFET with quantum channel, comprising:
an SOI wafer activated;
5 a quantum channel formed on the center of said SOI wafer activated;
a gate oxide film covering said quantum channel;
a source and a drain formed at both ends of said channel area; and
metal layers connected with said source and said drain.
2. The photodetector of claim 1, further comprising a gate formed additionally
10 on said gate oxide film so as to control carrier current in said quantum channel,
said gate being connected to the metal layers.
3. The photodetector of claim 1 or claim 2, wherein said gate oxide film
comprises oxides including SiO₂.
4. The photodetector of claim 1 or claim 2, wherein said MOSFET comprises N-
15 P-N type MOSFET.
5. The photodetector of claim 1 or claim 2, wherein said MOSFET comprises P-
N-P type MOSFET.
6. The photodetector of claim 1 or claim 3, wherein said gate oxide film has a
depth of 1nm ~ 50nm.
- 20 7. The photodetector of claim 1 or claim 2, wherein said both source and drain
have a depth of less than 1000nm.
8. The photodetector of claim 1 or claim 2, wherein said metal layers connected
with said source and said drain comprise a metal selected from the group
consisting of Al, Ti, W, In, Co, Au, Ni, and Cr.
- 25 9. The photodetector of claim 1 or claim 2, wherein said metal layers connected

with said source and said drain comprise a metal compound including a metal selected from the group consisting of Al, Ti, W, In, Co, Au, Ni, and Cr.

10. A method for making a photodetector using a MOSFET with quantum channel, comprising the steps of:

- 5 forming an activated area on SOI wafer;
 forming a quantum channel on the center of said activated area;
 forming a gate oxide film on the SOI wafer with said quantum channel;
 forming a source and a drain at both ends of said quantum channel; and
 depositing metal layers after forming contacts on said source and said drain.
- 10 11. The method as defined by claim 10, further comprising the steps of:
 forming an additional gate on said gate oxide film by means of lithography;
 and
 depositing metal layers after forming contacts on said additional gate.
12. The method as defined by claim 10 or claim 11, wherein the step of forming
15 an activated area is carried out by means of activated area mask, photolithography
 process, and etching process.
13. The method as defined by claim 10 or claim 11, wherein the step of forming a
 quantum channel is carried out by means of lithography technology including an
 etching process using a photomask.
- 20 14. The method as defined by claim 10 or claim 11, wherein the number of
 quantum channels formed is one or more.
15. The method as defined by claim 10 or claim 11, wherein the length of
 quantum channel formed is 1 nm ~ 1000 nm.
16. The method as defined by claim 10 or claim 11, wherein the width of
25 quantum channel formed is 1 nm ~ 20 nm.